

APOLLO

Physical Quantities and Measurements

FBISE Physics Class 11 (HSSC-I)

Domain A: Measurements

32 questions | questions

Original FBISE question crops. National Curriculum 2022-23 topic.

1.	Which of the following is the derived unit of density in terms of SI base units?	m^2/kg	m^3/kg	kg/m^3	kg/m^2
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2.	Students are dropping a ball from a height close to the ground to calculate the value of g . Students get slightly different values each time under similar conditions. This is because of:	lack of skills	uncertainty in measurements	temperature variation	variation in the value of g
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3.	A physical quantity has dimensions $[MLT^{-2}]$. This corresponds to:	energy	force	pressure	power
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5.	A student calculates the kinetic energy K of a moving body using $K = \frac{1}{2}mv^2$. If both m and v contain individual percentage uncertainties of 5% respectively, what is the total percentage uncertainty in the calculated kinetic energy K ?	5%	10%	15%	20%
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6.	The homogeneity of the equation $s = ut + \frac{1}{2}at^2$ is checked by:	comparing numerical values only	comparing dimensions of variables	Analyzing coefficients of variables	plotting s versus t
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7.	A measurement, which on repetition gives same or nearly same results, is called:	accurate reading	average reading	precise reading	estimated reading	○ ○ ○ ○
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8.	The fractional uncertainty in the given length $L \pm \Delta L = 2.0 \text{ m} \pm 0.1 \text{ m}$ is:	0.05	0.1	0.15	0.5	☐ ☐ ☐ ☐
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12.	Rod A has a length of $(12.0 \pm 0.2 \text{ cm})$ and rod B has a length of $(8.0 \pm 0.3 \text{ cm})$. Their combined length is given as:	$20.0 \pm 0.5 \text{ cm}$	$20.0 \pm 0.2 \text{ cm}$	$20.0 \pm 0.3 \text{ cm}$	$20.0 \pm 0.1 \text{ cm}$	☐ ☐ ☐ ☐
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Q. 2 Answers the following parts briefly.

(i)	Briefly explain 'precision' and 'accuracy' with a diagram.	1x3
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(xiii)	Use dimensional analysis to prove the equation $P = \rho gh$ is dimensionally homogeneous.	03
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(i)	Show that the equation $P = \rho gh$ is dimensionally homogeneous.	03
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(ii)	Time for 10 vibrations of a simple pendulum is 17.6s. Least count of stop watch is 0.1s. Find time period of simple pendulum. Also determine uncertainty in it.	03
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Show that:	$\frac{\text{Volt}}{\text{meter}} = \frac{\text{Newton}}{\text{Coulomb}}$	03
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(vi)	The energy of photon is given by $E=hf$, find the dimensions of Planck's constant h , where f is frequency.	03	OR	launch velocity. A point source of sound emits sound energy at a rate of 15 W. Calculate the intensity of sound at a distance of 4 m from the source.	03
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(i)	Deduce the dimensions of k from Coulomb's law $F = k \frac{q_1 q_2}{r^2}$.	03
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OR	A body of mass $(27.2 \pm 0.1) \text{ kg}$ has a volume of $(2.0 \pm 0.1) \text{ m}^3$. Calculate the density of the body? Find uncertainty in the density measurement.	03
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What is meant by precision? Also write the importance of taking multiple readings in an experiment.	1+2	OR	Find the area of the parallelogram whose adjacent sides are given by the vectors: $A = (\hat{i} + 6\hat{j} + 2\hat{k}) \text{ m}$ and $B = (7\hat{i} + \hat{j} + 5\hat{k}) \text{ m}$	03
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(i)	Deduce the dimensions of universal gravitational constant (G). $\left(F = G \frac{m_1 m_2}{r^2} \right)$	03	OR	Describe any three properties of dot product of two vectors.	1x3
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03	OR	Differentiate between accuracy and precision measurements. (Give a graphical example)
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(viii)	Write any three limitations of dimensional analysis.	03
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i.	Which of the following quantities are dimensionally similar?	Torque and work	Stress and spring constant	Angle and length	Strain and pressure
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ix.	What is the base unit of pressure?	kgms^{-1}	$\text{kgm}^{-1}\text{s}^{-1}$	$\text{kgm}^{-1}\text{s}^{-2}$	$\text{kgm}^2\text{s}^{-2}$
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(i)	An equation is dimensionally correct. Does it mean that equation is necessary correct?	03
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(v)	What is effect of radius of cross section of conductor on its resistance?	03	OR	Radius of sphere is measured with a screw gauge and is substituted in the formulae of its surface area ($A = \pi r^2$) and volume ($V = 4/3 \pi r^3$). Which of the two results will be more accurate?	03
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First Annual 2025 | Section A Q1 | 1 mark

Question	Work and power	Force and torque	Torque and power	Work and energy
1. Which pair has the same dimension? The length of body is measured as 3.51m if:				

First Annual 2025 | Section A Q2 | 1 mark

	power	torque	power	energy
2. The length of body is measured as 3.51m, if the accuracy is 0.01m, then the percentage uncertainty in the measurement is: A force of 10 N makes an angle of 30° with	3.51%	0.35%	0.28%	28.65%

First Annual 2025 | Section B Q2(xi) OR | 3 marks

the ball tend to deflect?
If an equation is dimensionally correct, is that equation a right equation?

First Annual 2025 | Section C Q4 | 6 marks

least two examples and four properties.
The length of a pendulum is $(1.5 \pm 0.01)m$ and the acceleration due to gravity is taken into account as $(9.8 \pm 0.01)ms^{-2}$. Calculate the time period of the pendulum with uncertainty in it.
What is Carnot's engine? Explain its working and

Second Annual 2025 | Section B Q2(i) | 3 marks

(i)	Briefly explain the difference between systematic errors (including zero error) and random errors with suitable examples.	03	OR	State New the law o example.
(ii)	Describe the head-to-tail rule for vector addition with			Give any tl

Second Annual 2025 | Section C Q3 | 7 marks

Q.3	Check the homogeneity of following equations using dimensional analysis: a. $T = 2\pi \sqrt{\frac{\ell}{g}}$ b. $2aS = V_f^2 - V_i^2$	07
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First Annual 2026 | Section B Q2(ii) | 3 marks

(ii)	Show that the equation for liquid pressure is $P = \rho gh$ dimensionally correct.	03
(iii)	The magnitude of dot and cross product of two vectors	03

First Annual 2026 | Section B Q2(xii) OR | 3 marks

OR	The length of a pendulum is $(100 \pm 0.1)cm$. If acceleration of free fall is $(9.8 \pm 0.1)ms^{-2}$. Calculate percentage in time period of the pendulum.	03
	Does the tension in the string of a swinging pendulum	03